

WHAT IS CLAIMED IS:

1 1. A laser diode driver output stage for driving an
2 associated laser diode device, the laser diode driver output
3 stage comprising:

4 a driver circuit having at least one input node and an
5 output node, the driver circuit adapted to receive an input
6 data signal at the at least one input node and provide an
7 output signal at the output node in response to the data
8 signal; and

9 a transformer coupled to the output node of the driver
10 circuit, the transformer adapted to receive the output signal
11 at a first side of the transformer and apply impedance
12 compensation to the output signal to provide an output drive
13 signal from a second side of the transformer, whereby the
14 output drive signal is used to drive the associated laser
15 diode device.

1 2. The laser diode driver output stage of claim 1,
2 wherein the first side of the transformer comprises a primary
3 side and the second side of the transformer comprises a
4 secondary side.

1 3. The laser diode driver output stage of claim 2,
2 wherein a negative terminal of the primary side of the
3 transformer is adapted to receive the output signal from the
4 driver circuit, and a negative terminal of the secondary
5 side of the transformer is adapted to provide the output
6 drive signal.

1 4. The laser diode driver output stage of claim 3,
2 wherein the primary side of the transformer is adapted to
3 compensate for a parasitic capacitance associated with the
4 driver circuit at a first frequency of operation.

1 5. The laser diode driver output stage of claim 4,
2 further comprising a primary side resistor coupled in
3 parallel with the primary side of the transformer, the
4 primary side resistor adapted to repress an output impedance
5 associated with the primary side of the transformer at a
6 second frequency of operation higher than the first
7 frequency of operation.

1 6. The laser diode driver output stage of claim 5,
2 further comprising:

3 a termination resistor connected to a positive terminal
4 of the primary side of the transformer, wherein the output
5 impedance of the laser diode driver output stage is
6 substantially equal to the impedance of the termination
7 resistor at a third frequency of operation lower than the
8 first frequency of operation.

1 7. The laser diode driver output stage of claim 5,
2 further comprising:

3 a secondary side resistor coupled in parallel with the
4 secondary side of the transformer, the secondary side
5 resistor and the secondary side of the transformer adapted
6 to compensate for the impedance of the termination resistor
7 at the third frequency of operation.

1 8. The laser diode driver output stage of claim 1,
2 wherein the driver circuit further comprises an output
3 switch architecture.

1 9. The laser diode driver output stage of claim 1,
2 wherein the driver circuit comprises a differential
3 amplifier.

1 10. The laser diode driver output stage of claim 1,
2 wherein the driver circuit comprises:

3 a first switch transistor adapted to receive a first
4 differential input data signal of the input data signal at
5 a first gate node; and

6 a second switch transistor adapted to receive a second
7 differential input data signal of the input data signal at
8 a second gate node,

9 wherein a first emitter node of the first switch
10 transistor is connected to a second emitter node of the
11 second switch transistor, and a first collector node of the
12 second switch transistor is adapted to provide the output
13 signal to the first side of the transformer.

1 11. The laser diode driver output stage of claim 10,
2 wherein the first switch transistor comprises a first
3 bipolar junction transistor, and the second switch
4 transistor comprises a second bipolar junction transistor.

1 12. The laser diode driver output stage of claim 10,
2 further comprising a current generator coupled to the first
3 emitter node and the second emitter node.

1 13. The laser diode driver circuit output stage of
2 claim 10, wherein a negative terminal of the first side of
3 the transformer is adapted to receive the output signal from
4 the first collector node of the second switch transistor,
5 and a negative terminal of the second side of the
6 transformer is adapted to provide the output drive signal.

1 14. The laser diode driver output stage of claim 13,
2 wherein the first side of the transformer is adapted to
3 compensate for a parasitic capacitance associated with the
4 first collector node of the second switch transistor at a
5 first frequency of operation.

1 15. The laser diode driver output stage of claim 1,
2 further comprising a pre-driver circuit adapted to provide
3 the input data signal to the driver circuit.

1 16. A method for providing an improved drive signal
2 from a laser diode driver output stage to a laser diode
3 device, the method comprising the steps of:

4 receiving an input data signal at a driver circuit;
5 providing an output signal from the driver circuit in
6 response to the data signal;

7 receiving the output signal at an input to a first side
8 of a transformer; and

9 applying impedance compensation to the output signal
10 to provide an output drive signal from an output of a second
11 side of the transformer, whereby the output drive signal is
12 used to drive the laser diode device.

1 17. The method of claim 16, wherein the first side of
2 the transformer comprises a primary side and the second side
3 of the transformer comprises a secondary side.

1 18. The method of claim 17, wherein the step of
2 applying impedance compensation comprises compensating for
3 a parasitic capacitance associated with the driver circuit

4 at a first frequency of operation using the primary side of
5 the transformer.

1 19. The method of claim 18, wherein the step of
2 applying impedance compensation comprises repressing an
3 output impedance associated with the primary side of the
4 transformer at a second frequency of operation higher than
5 the first frequency of operation using a primary side
6 resistor connected in parallel with the primary side of the
7 transformer.

1 20. The method of claim 19, wherein the output
2 impedance of the laser diode driver output stage at a third
3 frequency of operation lower than the first frequency of
4 operation is substantially equal to the impedance of a
5 termination resistor coupled to a positive terminal of the
6 primary side of the transformer.

1 21. The method of claim 20, wherein the step of
2 applying impedance compensation to the output signal further
3 comprises the step of compensating for the impedance of the

4 termination resistor at the third frequency of operation
5 using a secondary side resistor coupled in parallel with the
6 secondary side of the transformer, and a secondary side of
7 the transformer.

1 22. The method of claim 16, further comprising the
2 step of providing the output drive signal to the laser diode
3 device using a transmission line.